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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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10/538,821

02/22/2006

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08/22/2006

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EXAMINER

CLARK, JASMINE JHIHAN B

ART UNIT

PAPER NUMBER

2815

DATE MAILED: 08/22/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

| | | | |
|------------------------------|--------------------------------------|------------------------------------|--|
| Office Action Summary | Application No. 10/538,821 | Applicant(s) FERY ET AL. | |
| | Examiner Jasmine J. Clark | Art Unit 2815 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-36 is/are pending in the application.
 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☐ Claim(s) 1-7, 10-12, 18-24, 28-29 is/are rejected.
- 7) ☒ Claim(s) 8, 9, 13-17, 25-27 and 31-36 is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. ____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|--|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s)/Mail Date. ____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date <u>10/20/5</u> . | 6) <input type="checkbox"/> Other: ____ |

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-6, 10-12, 18-24, and 28-30 are rejected under 35 U.S.C. 102(b) as being anticipated by Vogel et al. (US 6,317,326 B1).

Vogel '326 discloses a device (see Fig. 2A), comprising a lid 210 which serves as a heat spreader component (see column 3, for 41), wherein the heat spreader component comprises a top surface, a bottom surface and a at least one heat spreader material, and at least one solder material 214 (see column 3, lines 48-50), wherein the solder material is directly deposited onto the bottom surface of the heat spreader component 210.

Concerning claims 2-4, the device of claim 1, wherein the solder material 214 is further coupled to a substrate 206, and wherein the substrate comprises silicon (see column 3, lines 5-6), and whereas the silicon substrate can be directly soldered to the heat spreader 210 which is considered as a metallized silicon die..

Concerning claims 5 and 6, the device of claim 1, wherein the heat spreader component comprises a metal, for example, copper (see column 3, lines 43-44)

Concerning claims 10-12, the device of claim 1, wherein at least one solder material comprises a metal, for example: silver (see column 3, line 61 to column 4, line 3), and where silver is a transition metal (Silver (Ag) is one of the 40 transition metals).

Initially, and with respect to claim 18 “..of claim 1, wherein the solder material is directly deposited using electrodeposition”, note that a “product by process” claim is directed to the product per se, no matter how actually made. See *In re Thorpe et al.*, 227 USPQ 964 (CAFC, 1985) and the related case law cited therein which make it clear that it is the final product per se which must be determined in a “product by process” claim, and not the patentability of the process, and that, as here, an old or obvious product produced by a new method is not patentable as a product, whether claimed in “product by process” claims or not. Note that the Applicants have burden of proof in such cases as the above case law makes clear.

Concerning claim 19, Fig. 2B shows a method of forming a device, comprising:
providing a heat spreader component 210 (see above discussion), wherein the heat spreader component 210 comprises a top surface, a bottom surface and at least one heat spreader material;

providing at least one solder material 214 (see the above discussion), wherein the solder material 214 is directly, deposited onto the bottom surface of the heat spreader component 210; and

depositing the at least one solder material 214 onto the bottom surface of the heat spreader component 210.

Concerning claims 20-22, the method of claim 19, wherein the solder material 214 is further coupled to a substrate 206, wherein the substrate 206 comprises silicon (see the above discussion under claims 2 and 3), and whereas the silicon is a metallized silicon die (see the above discussion under claim 4 above).

Concerning claims 23 and 24, the limitations are similar to claims 5 and 6, please see the above discussion.

Concerning claims 28-30, the limitations are similar to claims 10-12, please see the above discussion.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 7, and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over the reference as applied to claims 1-6, 10-12, 18-24, and 28-30 above, and further in view of Ito et al. (JP 2000-294699).

As discussed above, the applied reference 326 discloses, wherein the heat spreader component comprises a metal, for example, copper (see column 3, lines 43-44), but does not literally disclose including metal-based material which comprises, for example carbon. Ito '699 discloses having heat sink which is formed of eg., carbon fiber composite Al (see abstract). Hence it would have been obvious to have the metal-based material for heat spreader for having the improved operation life and heat radiation properly for temperature change as taught by Ito '699.

3. Claims 8, 9, 13-17, 25-27, and 31-36 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Telephone Inquiry Contacts

4. Regarding a solder layer that joints between a semiconductor die and heat spreader or heat sink, please see Wu (US 5,777,385) and Yoshinaga et al. (US 5,886,403).

Telephone Inquiry Contacts

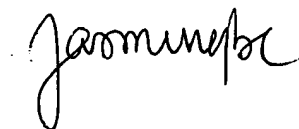
5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jasmine J. Clark whose telephone number is (571) 272-1726. The examiner can normally be reached on Flex.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tom Thomas can be reached on (571) 272-1664. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Jjbc/08/17/06

**JASMINE CLARK
PRIMARY EXAMINER**

A handwritten signature in cursive script, appearing to read 'Jasmine Clark', is written below the printed name and title.